REMARKS

Favorable reconsideration of this application, in light of the following discussion, is respectfully requested.

Claim 1 is amended without narrowing the claims. Claims 1-8 are pending.

I.   Objection to the Title

In the Office Action, at page 2, numbered paragraph 1, the title of the invention was objected to. The title was amended in accordance with the Examiner's comments, and accordingly, withdrawal of the objection to the title is respectfully requested.

II.   Rejection under 35 U.S.C. § 102

In the Office Action, at page 2, numbered paragraph 3, claims 1, 2, 3, 7 and 8 were rejected under 35 U.S.C. § 102(b) as being unpatentable over European Patent No. 1 043 689. This rejection is respectfully traversed because EP '689 does not discuss or suggest:

> model pattern creating means for creating a model pattern based on image data of a reference object with a reference orientation relative to said image capturing means captured by said image capturing means, said reference object having a shape substantially identical to that of the object;
>
> transformation means for performing two-dimensional and geometrical transformation of the created model pattern to generate a transformed model pattern representing an image of the object with an orientation different from the reference orientation;...[and]
>
> selecting means for repeatedly performing the generation of a transformed model pattern and the pattern matching of the image data of the object with the transformed model pattern to thereby select one of the transformed model patterns in conformity with the image data of the object, and obtain information on a position of the image of the object in the image data...,

as recited in independent claim 1.

EP '689 discusses an image processing apparatus that is capable of detecting the position and posture of individual workpieces. Reference models are created from two-dimensional images of a reference workpiece captured in a plurality of directions by a camera, and the relative positions/postures of the workpiece with respect to the camera at the respective image capturing are stored. Thereafter, an image of a workpiece that matches one of the reference models is selected by matching processing of the reference model with the captured

image, and a three-dimensional position/posture of the workpiece with respect to the camera is obtained from the image of the selected workpiece, the selected reference model and the position/posture information associated with the reference model.

EP '689 does not discuss or suggest that two-dimensional and geometrical transformation is performed of a created model pattern to generate a transformed model pattern representing an image of the object with an orientation different from a reference orientation, where the model pattern is created based on image data of a reference object with a reference orientation relative to an image capturing means captured by the image capturing means. EP '689 discusses specifically that the image processing apparatus 30 performs capturing of an image of a reference workpiece with a camera 20 and the captured image data is stored (step 102). EP '689 further discusses that the relative position/posture of the workpiece with respect to the camera is obtained and stored as the relative position/posture of the reference model (step 103).

While EP '689 does discuss that various reference models are created by capturing images of the workpiece based on rotation angles of the reference workpiece, EP '689 does not discuss or suggest that a model pattern is created based on image data of a reference object and then two-dimensional and geometrical transformation of the created model pattern is performed to generate a transformed model pattern. The Examiner alleges that, at Fig. 5, steps 102 and 103, EP '689 corresponds to the model pattern creating means and the transformation means of the present invention of claim 1, for example. The Applicants respectfully disagree.

Specifically, in steps 102 and 103 in EP '689, images of the workpiece are captured in various directions by the camera in the real 3-dimensional space and the relative positions/postures of the workpiece at the time of image capturing are stored to be associated with model patterns created from the captured images. In step 103, which the Examiner referred to as being relevant for performing two-dimensional and geometrical transformation of the created model pattern, EP '689 describes only that the relative position/posture of the camera and the workpiece is obtained and stored to be associated with model patterns created from images. However, arranging the actual object to take numerous predetermined postures relative to the image capturing device is laborious and requires storing a large number of model patterns.

In contrast, the present invention of claim 1, for example, creates a model pattern based on captured image data of a reference object, performs two-dimensional and geometrical transformation of the created model pattern to generate a transformed model pattern

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representing an image of the object with an orientation different from the reference orientation and then performs pattern matching of the image data of the object with the transformed model pattern. EP '689 does not perform two-dimensional and geometrical transformation of the created model patterns that are created at rotation angles of zero degree, 30 degrees, 60 degrees and 90 degrees. EP '689 requires creating numerous model patterns, but does not use a single model pattern that is transformed by two-dimensional geometrical transformations in order to generate a transformed model pattern representing an image of the object with an orientation different from the reference orientation. Thus, the present invention of claim 1 does not require capturing images at numerous postures and storing numerous model patterns that are created based on the captured images.

Additionally, while EP '689 does discuss that pattern matching is performed to determine the model pattern that has a highest matching value from amongst the model patterns, EP '689 does not discuss or suggest repeatedly performing the generation of a *transformed* model pattern to thereby select one of the transformed model patterns in conformity with the image data of the object.

Further, EP '689 does not discuss or suggest generating a plurality of transformed model patterns that were created based on a previously created model pattern and then performing pattern matching of the image data of the object with the plurality of transformed model patterns to select one of the transformed model patterns in conformity with the image data of the object.

Therefore, as EP '689 does not discuss or suggest "transformation means for performing two-dimensional and geometrical transformation of the created model pattern to generate a transformed model pattern representing an image of the object with an orientation different from the reference orientation;... [and] selecting means for repeatedly performing the generation of a transformed model pattern and the pattern matching of the image data of the object with the transformed model pattern to thereby select one of the transformed model patterns in conformity with the image data of the object, and obtain information on a position of the image of the object in the image data...," as recited in independent claim 1, claim 1 patentably distinguishes over the reference relied upon. Accordingly, withdrawal of the § 102(b) rejection is respectfully requested.

Further, EP '689 does not discuss or suggest "transformation means for performing two-dimensional and geometrical transformation of the created model pattern to generate a plurality of transformed model patterns each representing an image of the object with an orientation different from the reference position;... [and] pattern matching means for performing pattern

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matching of the image data of the object captured by said image capturing means with the plurality of transformed model patterns to thereby select one of the transformed model patterns in conformity with the image data of the object, and obtain information on a position of the image of the object in the image data...," as recited in independent claim 2. Therefore, claim 2 patentably distinguishes over the reference relied upon. Accordingly, withdrawal of the § 102(b) rejection is respectfully requested.

Claims 3, 7 and 8 depend either directly or indirectly from independent claims 1 and 2 and include all the features of their respective independent claims, plus additional features that are not discussed or suggested by the reference relied upon. For example, claim 3 recites that "said transformation means performs the two-dimensional and geometrical transformation of an affine transformation, and said image processing device further comprises additional measuring means for obtaining a sign of inclination of the object with respect to said image capturing means." Therefore, claims 3, 7 and 8 patentably distinguish over the reference relied upon for at least the reasons noted above. Accordingly, withdrawal of the § 102(b) rejection is respectfully requested.

III.   Rejections under 35 U.S.C. § 103

In the Office Action, at pages 6-8, numbered paragraphs 5-7, claims 4-6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over various combinations of EP '689 in view of U.S. Patent Pub. No. 2003/0161537 to Maeda et al., U.S. Patent No. 6,806,903 to Okisu et al. and U.S. Patent Pub. No. 2003/0161504 to Inoue. These rejections are respectfully traversed.

Maeda, Okisu and Inoue fail to make up for the deficiencies in EP '689. Therefore, claims 1 and 2 patentably distinguish over the references relied upon for at least the reasons noted above.

Claims 4-6 depend from independent claims 1 and 2 and include all the features of claims 1 and 2, plus additional features that are not discussed or suggested by the references relied upon. For example, claim 4 recites that "said additional measuring means performs dividing of a model pattern into at least two partial model patterns which are subject to the affine transformation to generate transformed partial model patterns, and pattern matching of the image data of the object with the transformed partial model patterns to determine most conformable sizes, and determines the sign of the inclination based on comparison of the sizes of the conformable partial model patterns with each other." Further, Maeda, Okisu and Inoue fail to make up for the deficiencies in EP '689. Therefore, claims 4-6 patentably distinguish over the

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references relied upon for at least the reasons noted above. Accordingly, withdrawal of the § 103(a) rejection is respectfully requested.

Conclusion

In accordance with the foregoing, the specification and claim 1 have been amended. Claims 1-8 are pending and under consideration.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: 10/10/07   By: _____

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